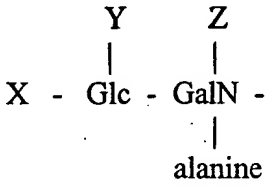
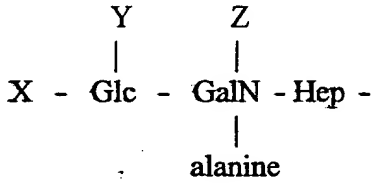
Claims

1. A method for upregulating CFTR expression in a tissue of a subject comprising administering to a subject in need of such upregulation of CFTR expression a CFTR expression regulator in an amount effective to increase CFTR expression in said tissue of the subject, wherein the CFTR expression regulator is an isolated polysaccharide that is an LPS core moiety comprising

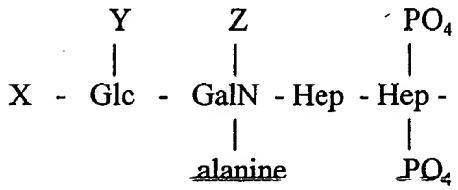


wherein X is selected from the group consisting of glucose, glucose-rhamnose and H; Y is selected from the group consisting of rhamnose and H; and Z is selected from the group consisting of glucose and H.

2. The method of claim 1 wherein the polysaccharide comprises



3. The method of claim 1 wherein the polysaccharide comprises



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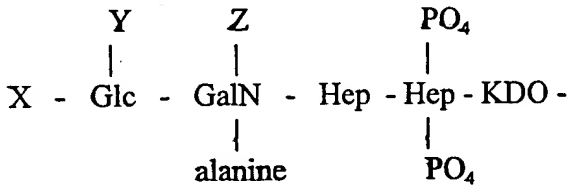
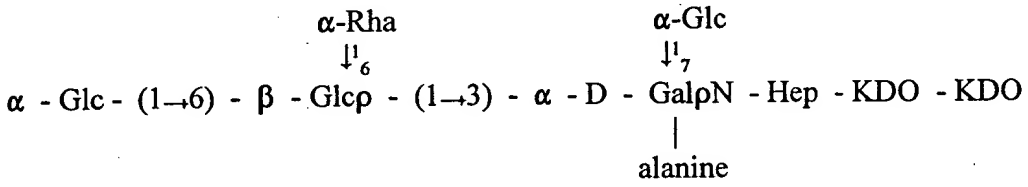
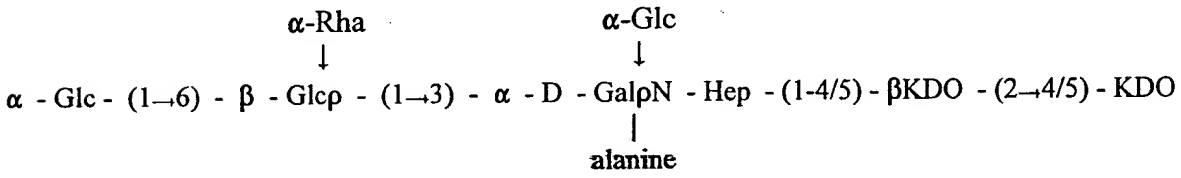
4. The method of claim 1 wherein the polysaccharide comprises



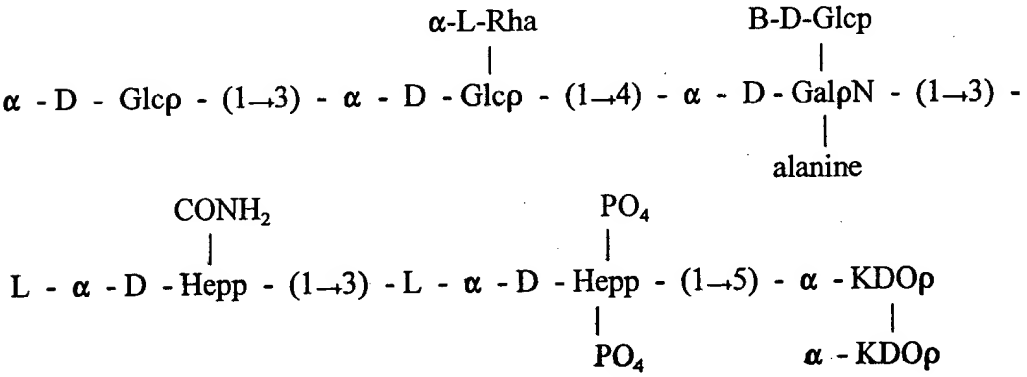
5. The method of claim 1 wherein the polysaccharide comprises



6. The method of claim 1 wherein the polysaccharide comprises



7. The method of claim 1 wherein the polysaccharide comprises



8. The method of claim 1 wherein the polysaccharide is a CFTR receptor-binding fragment of a lipopolysaccharide of *Pseudomonas aeruginosa.*

9. The method of claims 1-8 wherein the subject has a condition predisposing the subject to a *Pseudomonal* infection.

10. The method of claims 1-8 wherein the subject has a *Pseudomonal* infection.

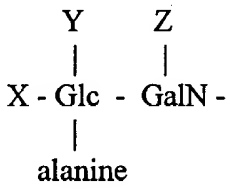
11. The method of claims 1-8 wherein the subject has a defective cystic fibrosis transmembrane conductance regulator gene.

12. The method of claims 1-8 wherein the polysaccharide is administered systemically to the subject.

13. The method of claims 1-8 wherein the polysaccharide is administered by inhalation to the subject.

14. A pharmaceutical preparation comprising

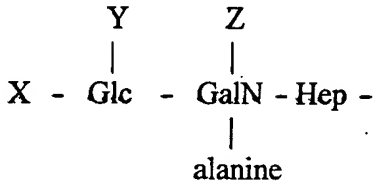
a therapeutically effective amount of a CFTR expression regulator, wherein the CFTR expression regulator is a polysaccharide that is an LPS core moiety comprising



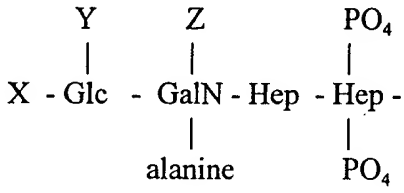
wherein X is selected from the group consisting of glucose, glucose-rhamnose and H;
wherein Y is selected from the group consisting of rhamnose and H; and
wherein Z is selected from the group consisting of glucose and H; and

a pharmaceutically acceptable carrier.

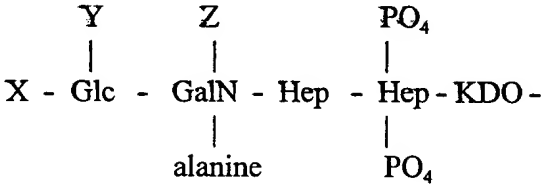
15. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises



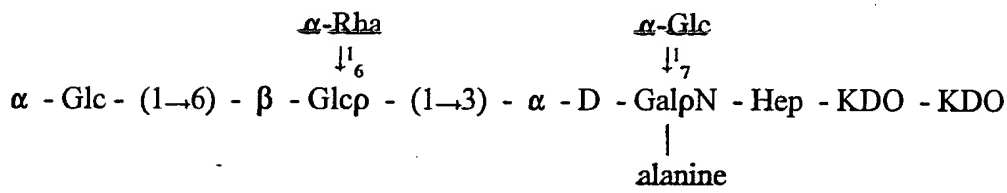
16. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises



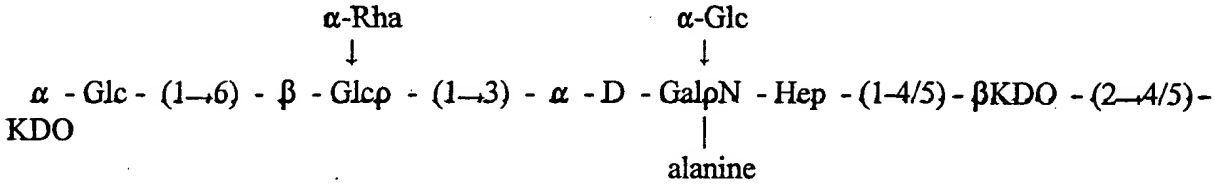
17. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises



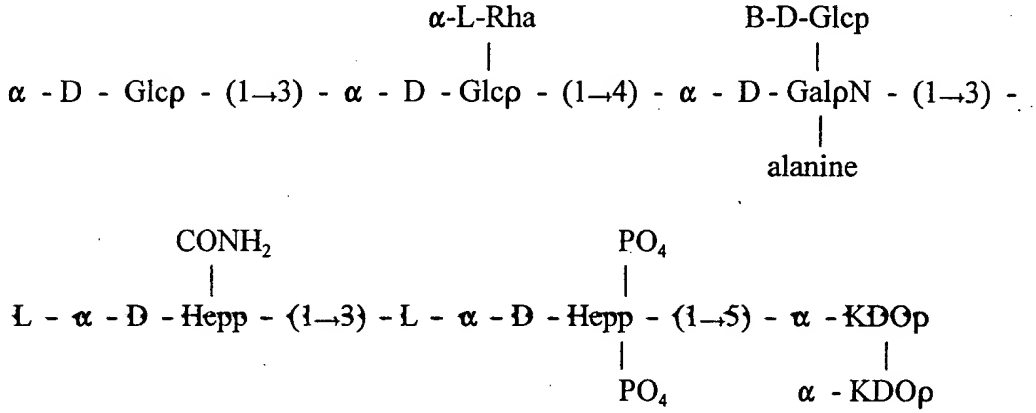
18. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises



19. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises



20. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises



21. The pharmaceutical preparation of claim 14 wherein the polysaccharide comprises a CFTR binding fragment of a lipopolysaccharide of *Pseudomonas aeruginosa.*

22. The pharmaceutical preparation of claims 14-21 wherein the pharmaceutical preparation is sterile.

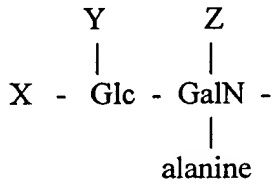
23. The pharmaceutical preparation of claims 14-21 wherein the pharmaceutical preparation is formulated in a unit dosage in an amount effective for treating *Pseudomonal* infection.

24. The pharmaceutical preparation of claims 14-21 wherein the pharmaceutical preparation is formulated as an aerosol for inhalation.

25. The pharmaceutical preparation of claims 14-21 wherein the pharmaceutical preparation is formulated as an injectable preparation.

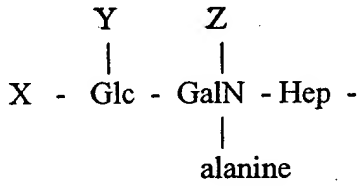
26. A composition of matter comprising

a covalent conjugate of a lipid biocompatible with a human subject and a polysaccharide comprising

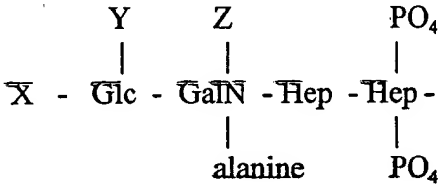


wherein X is selected from the group consisting of glucose, glucose-rhamnose and H; Y is selected from the group consisting of rhamnose and H; and Z is selected from the group consisting of glucose and H.

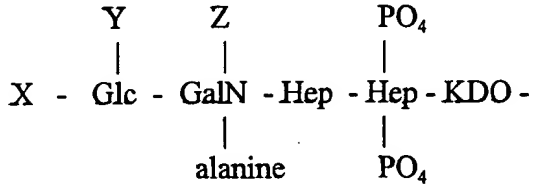
27. The composition of matter of claim 26 wherein the polysaccharide comprises



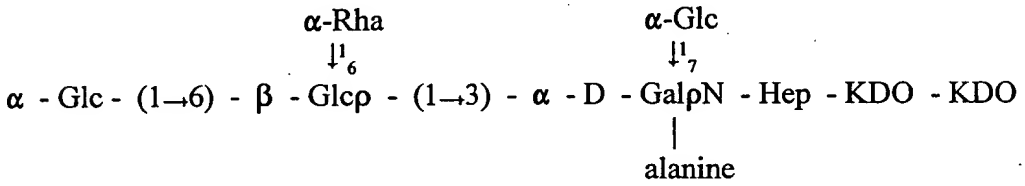
28. The composition of matter of claim 26 wherein the polysaccharide comprises



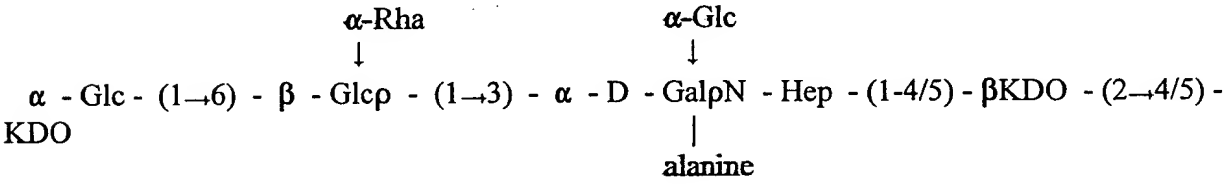
29. The composition of matter of claim 26 wherein the polysaccharide comprises



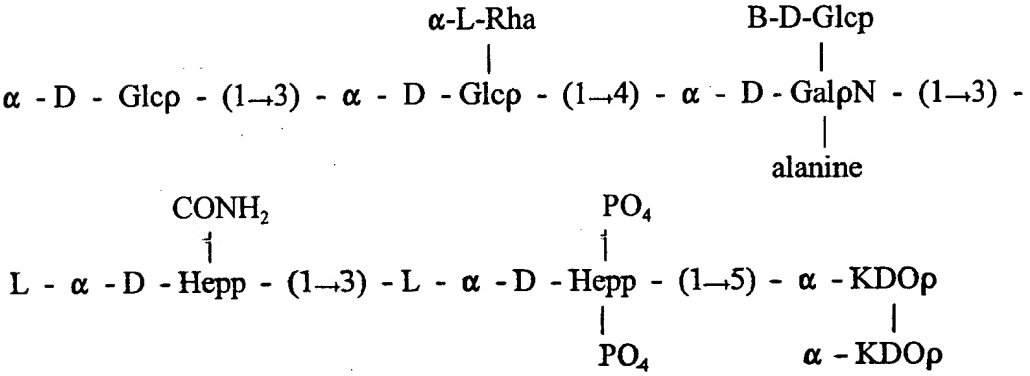
30. The composition of matter of claim 26 wherein the polysaccharide comprises



31. The composition of matter of claim 26 wherein the polysaccharide comprises



32. The composition of matter of claim 26 wherein the polysaccharide comprises



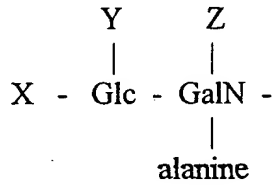
33. The composition of matter of claim 26 wherein the polysaccharide comprises a CFTR binding fragment of a lipopolysaccharide of *Pseudomonas aeruginosa.*

34. The composition of matter of claims 26-33 wherein the lipid has the following structural formula: $CH_3(CH_2)_nCOOH$ wherein n=1-50.

35. The composition of matter of claim 34 wherein the lipid wherein the lipid is in the wall of a liposome containing a bioactive agent.

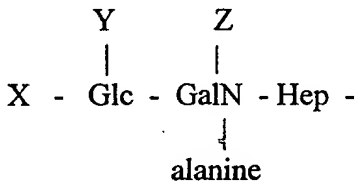
36. A composition of matter comprising

a covalent conjugate of a bioactive agent and a polysaccharide comprising

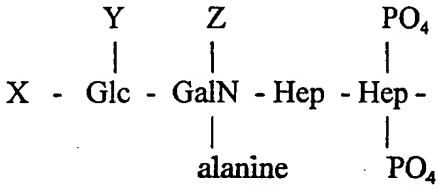


wherein X is selected from the group consisting of glucose, glucose-rhamnose and H; Y is selected from the group consisting of rhamnose and H; and Z is selected from the group consisting of glucose and H.

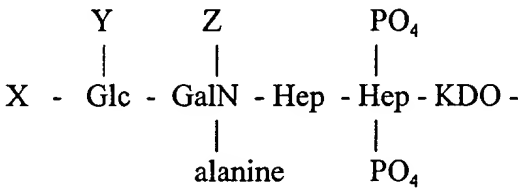
37. The composition of matter of claim 36 wherein the polysaccharide comprises



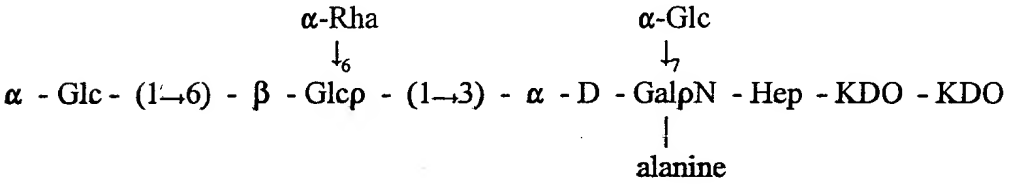
38. The composition of matter of claim 36 wherein the polysaccharide comprises



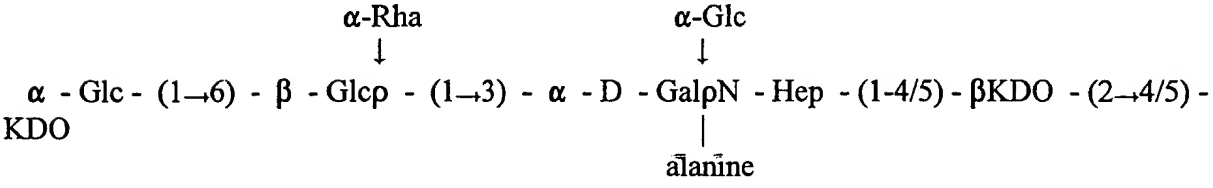
39. The composition of matter of claim 36 wherein the polysaccharide comprises



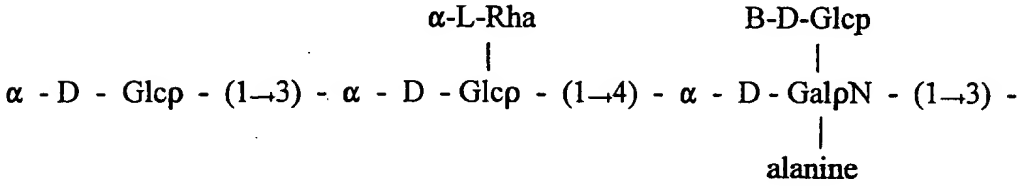
40. The composition of matter of claim 36 wherein the polysaccharide comprises

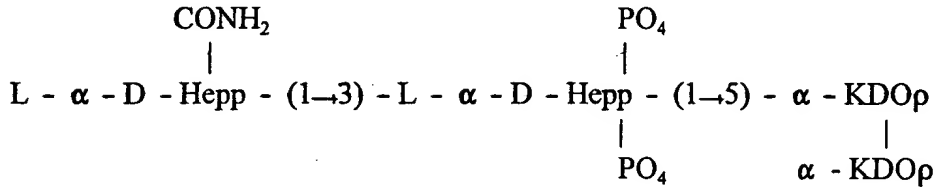


41. The composition of matter of claim 36 wherein the polysaccharide comprises



42. The composition of matter of claim 36 wherein the polysaccharide comprises

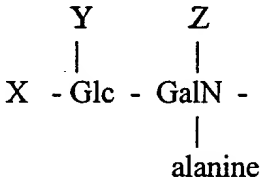




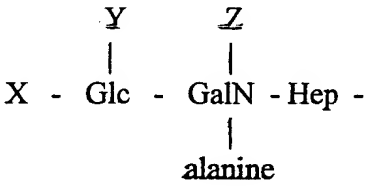
43. The composition of matter of claim 36 wherein the polysaccharide comprises a CFTR binding fragment of a lipopolysaccharide of *Pseudomonas aeruginosa*.

44. A method for delivering a bioactive agent to a tissue expressing a cystic fibrosis transmembrane regulator to treat a condition susceptible to treatment by said bioactive agent comprising

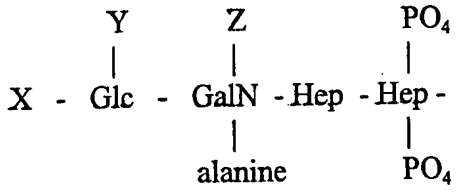
administering to a subject in need of such treatments said bioactive agent coupled to a polysaccharide comprising



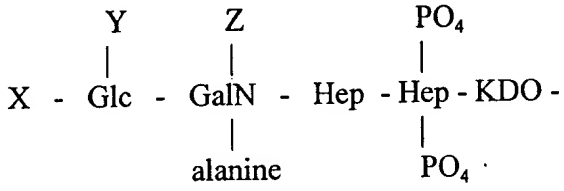
45. The method of claim 44, wherein the polysaccharide comprises



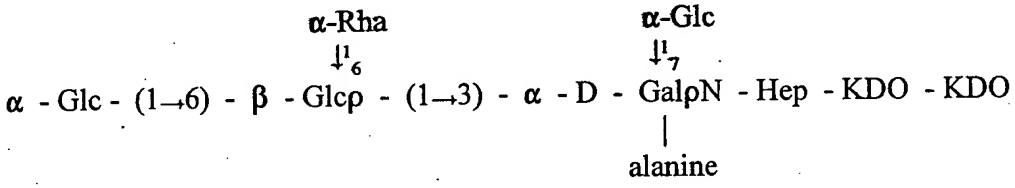
46. The method of claim 44, wherein the polysaccharide comprises



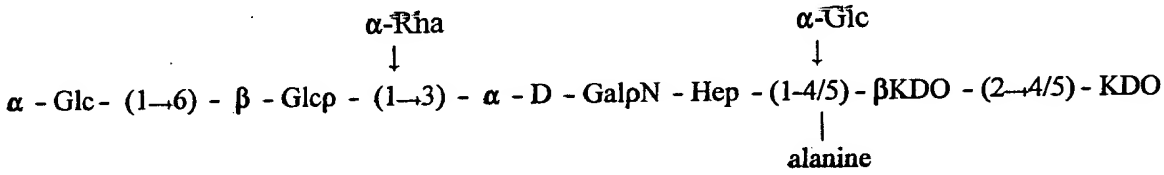
47. The method of claim 44, wherein the polysaccharide comprises



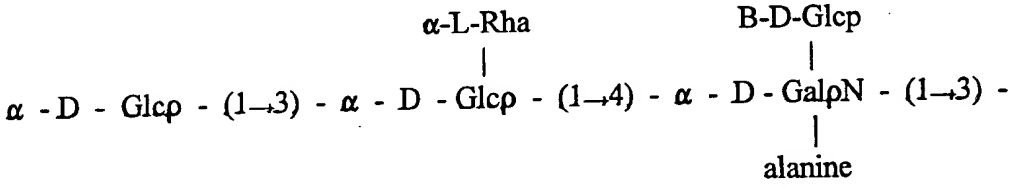
48. The method of claim 44, wherein the polysaccharide comprises

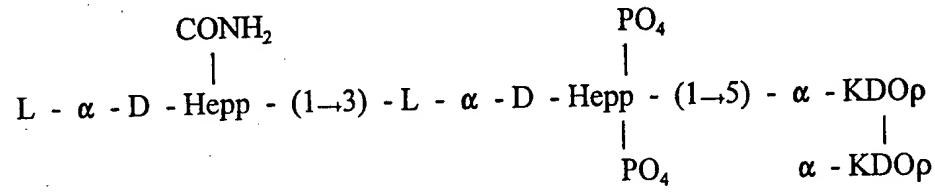


49. The method of claim 44, wherein the polysaccharide comprises



50. The method of claim 44, wherein the polysaccharide comprises





51. The method of claim 44, wherein the polysaccharide comprises a CFTR binding fragment of a lipopolysaccharide of *Pseudomonas aeruginosa*.

52. The method of claims 44-51 wherein the bioactive agent is covalently coupled to the polysaccharide.

53. The method of claims 44-51 wherein the bioactive agent is contained in a liposome comprising a lipid biocompatible with a human subject, and wherein the polysaccharide is covalently coupled to the lipid.

54. A composition of matter comprising

a covalent conjugate of an anti-*Pseudomonas* drug and a cystic fibrosis transmembrane conductance regulator or a *Pseudomonas* lipopolysaccharide-binding fragment of a cystic fibrosis transmembrane conductance regulator.

55. The composition of claim 54 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 4 consecutive amino acids of SEQ ID NO 3.

56. The composition of claim 54 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 5 consecutive amino acids of SEQ ID NO 3.

57. The composition of claim 54 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 6 consecutive amino acids of SEQ ID NO 3.

58. The composition of claim 54 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 7 consecutive amino acids of SEQ ID NO 3.

59. The composition of claim 54 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 8 consecutive amino acids of SEQ ID NO 3.

60. The composition of claims 54-59 wherein the anti-*Pseudomonal* drug is an antibiotic.

61. The composition of claims 54-59 wherein the anti-*Pseudomonal* drug is selected from the group consisting of Amifloxacin; Amifloxacin Mesylate; Amikacin; Amikacin Sulfate; Aminosalicylic acid; Aminosalicylate sodium; Azlocillin; Azlocillin Sodium; Bacampicillin Hydrochloride; Carbenicillin Disodium; Carbenicillin Indanyl Sodium; Carbenicillin Phenyl Sodium; Carbenicillin Potassium; Carumonam Sodium; Cefaclor; Cefadroxil; Cefamandole; Cefamandole Nafate; Cefamandole Sodium; Cefaparole; Cefatrizine; Cefazaflur Sodium; Cefazolin; Cefazolin Sodium; Cefbuperazone; Cefdinir; Cefepime; Cefepime Hydrochloride; Cefetecol; Cefixime; Cefmenoxime Hydrochloride; Cefmetazole; Cefmetazole Sodium; Cefonicid Monosodium; Cefonicid Sodium; Cefoperazone Sodium; Ceforanide; Cefotaxime Sodium; Cefotetan; Cefotetan Disodium; Cefotiam Hydrochloride; Cefoxitin; Cefoxitin Sodium; Cefpimizole; Cefpimizole Sodium; Cefpiramide; Cefpiramide Sodium; Cefpirome Sulfate; Cefpodoxime Proxetil; Cefprozil; Cefroxadine; Cefsulodin Sodium; Ceftazidime; Ceftibuten; Ceftizoxime Sodium; Ceftriaxone Sodium; Cefuroxime; Cefuroxime Axetil; Cefuroxime Pivoxetil; Cefuroxime Sodium; Cephacetrile Sodium; Cephalexin; Cephalexin Hydrochloride;

Cephaloglycin; Cephaloridine; Cephalothin Sodium; Cephapirin Sodium; Cephradine; Cetocycline Hydrochloride; Cetophenicol; Chlortetracycline Bisulfate ; Chlortetracycline Hydrochloride ; Ciprofloxacin; Ciprofloxacin Hydrochloride; Colistin Sulfate; Coumermycin; Coumermycin Sodium; Doxycycline; Doxycycline Calcium; Doxycycline Fosfatex; Doxycycline Hyclate; Droxacin Sodium; Enoxacin; Epicillin; Epitetracycline Hydrochloride; Imipenem; Kanamycin Sulfate; Meclocycline; Minocycline; Minocycline Hydrochloride; Nafcillin Sodium; Norfloxacin; Ofloxacin;Oxytetracycline; Oxytetracycline Calcium; Piperacillin Sodium; Pirbenicillin Sodium; Tetracycline; Tetracycline Hydrochloride ; Tetracycline Phosphate Complex; Ticarcillin Cresyl Sodium; Ticarcillin Disodium; Ticarcillin Monosodium; Tobramycin; and Tobramycin Sulfate.

62. A polypeptide comprising an isolated *Pseudomonal* lipopolysaccharide-binding fragment of a cystic fibrosis transmembrane conductance regulator.

63. The composition of claim 62 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 4 consecutive amino acids of SEQ ID NO 3.

64. The composition of claim 62 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 5 consecutive amino acids of SEQ ID NO 3.

65. The composition of claim 62 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 6 consecutive amino acids of SEQ ID NO 3.

66. The composition of claim 62 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 7 consecutive amino acids of SEQ ID NO 3.

67. The composition of claim 62 wherein the *Pseudomonas* lipopolysaccharide-binding fragment comprises at least 8 consecutive amino acids of SEQ ID NO 3.